

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A non-transitory computer readable medium for a data storage device encoded with a snapshot tree structure and code for managing the snapshot tree structure to provide point-in-time backups of a base volume, wherein:

the snapshot tree structure comprises:

a first branch, comprising:

the base volume storing a current user data;

a first read-only snapshot descending from the base volume, the first read-only snapshot being created at a first time, the first read-only snapshot storing a first data of the base volume at the first time before the first data is modified in the base volume; and

a second read-only snapshot descending from the first read-only snapshot, the second read-only snapshot being created at a second time earlier than the first time, the second read-only snapshot storing a second data of the base volume at the second time before the second data is modified in the base volume; and

the code comprises instructions to retrieve data from the snapshot tree structure and transmitting the retrieved data to a host device.

Claim 2 (currently amended): The non-transitory computer readable medium of claim 1, wherein the snapshot tree structure further comprises: ~~of claim 1, further comprising:~~

a second branch, comprising a first read-write snapshot descending from one of the first and the second read-only snapshots.

Claim 3 (currently amended): The non-transitory computer readable medium of claim 2, ~~The snapshot tree structure of claim 2,~~ wherein the second branch further comprises a third read-only

snapshot descending from the first read-write snapshot, the third read-only snapshot being created at a third time, the third read-only snapshot storing a third data of the first read-write snapshot at the third time before the third data is modified in the first read-write snapshot.

Claim 4 (currently amended): The non-transitory computer readable medium of claim 3, wherein the snapshot tree structure further comprises: ~~of claim 3, further comprising:~~

a third branch, comprising a second read-write snapshot descending from the third read-only snapshot.

Claim 5 (currently amended): The non-transitory computer readable medium of claim 1, The snapshot tree structure of claim 4, wherein the third branch further comprises a fourth read-only snapshot descending from the second read-write snapshot, the fourth read-only snapshot being created at a fourth time, the fourth read-only snapshot storing a fourth data of the second read-write snapshot at the fourth time before the fourth data is modified in the second read read-write snapshot.

Claim 6 (previously presented): A method for a data storage device to store snapshots that provide point-in-time backups of a base volume using a snapshot tree structure, the method comprising:

creating a first branch, comprising:

creating the base volume storing a current user data;

creating a first read-only snapshot descending from the base volume, the first read-only snapshot being created at a first time;

storing in the first read-only snapshot a first data of the base volume at the first time before the first data is modified in the base volume;

creating a second read-only snapshot descending from the base volume, the second read-only snapshot being created at a second time later than the first time;

storing in the second read-only snapshot a second data of the base volume at the second time before the second data is modified in the base volume; and

inserting the second read-only snapshot between the base volume and the first read-only snapshot, wherein the first read-only snapshot now descends from the second read-only snapshot; and

retrieving data from the snapshot tree structure and transmitting the retrieved data to a host device.

Claim 7 (original): The method of claim 6, further comprising:

creating a second branch, comprising creating a first read-write snapshot descending from one of the first and the second read-only snapshots.

Claim 8 (original): The method of claim 7, wherein said creating a second branch further comprises creating a third read-only snapshot descending from the first read-write snapshot, the third read-only snapshot being created at a third time, the third read-only snapshot storing a third data of the first read-write snapshot at the third time before the third data is modified in the first read-write snapshot.

Claim 9 (original): The method of claim 8, further comprising:

creating a third branch, comprising creating a second read-write snapshot descending from the third read-only snapshot.

Claim 10 (currently amended): The method of claim 9, wherein said creating a third branch further comprises creating a fourth read-only snapshot descending from the second read-write snapshot, the fourth read-only snapshot being created at a fourth time, the fourth read-only snapshot storing a fourth data of the second read-write snapshot at the fourth time before the fourth data is modified in the second read read-write snapshot.

Claim 11 (previously presented): A method for a data storage device to retrieve a point-in-time backup of a base volume by reading a value of a data block from a snapshot tree structure having the base volume, a first snapshot descending from the base volume, and a second snapshot descending from the first snapshot, the method comprising:

searching for the data block in the second snapshot;

if the data block is not found in the second snapshot:

following a link in the second snapshot to the first snapshot; and

searching for the data block in the first snapshot; and

transmitting the data block to a host device after the data block is found.

Claim 12 (original): The method of claim 11, wherein the first and the second snapshots are read-only snapshots.

Claim 13 (original): The method of claim 11, wherein the first snapshot is a read-only snapshot and the second snapshot is a read-write snapshot.

Claim 14 (currently amended): The method of claim 11, further comprising:

if the data block is not found in the first snapshot:

following [[a]] another link in the first snapshot to the base volume; and

reading the data block from the base volume.